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ABSTRACT

Correlates of reading and writing achievement were examined in Pennsylvania's Educational Quality Assessment program. Data came from the 1978 and 1979 assessments of fifth, eighth, and eleventh grade students. The 35 variables serving as correlates were classified as school (manipulable) and home/community (nonmanipulable), and were derived from students, teachers, and the schools. The results were consistent with many other studies in demonstrating strong relationships between socioeconomic factors and building level achievement in reading and writing skills. These included a negative relationship with family size and positive relationships with parental education and occupation, amount of reading materials in the home, and percentage of white students. A number of school/teacher variables that reflected substantial correlations with achievement were found to undergo sizable reductions when parental occupation was partialled out. These included teacher perceptions of their relationships with students and parents, classroom disruptions, discipline problems, and satisfaction with parental relationships. A curvilinear relationship was found between building level achievement and two of the community variables, population density and stability of student residence. Student level correlations were characteristically much lower than those based on data aggregated at the building level. Parental and personal educational expectations were the most prominent correlates at the eighth and eleventh grade levels. (RL)

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CORRELATES OF READING AND WRITING ACHIEVEMENT

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Presented at the annual meeting of the
American Educational Research Association

Los Angeles, California
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Title: Correlates of Reading and Writing Achievement

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Institution: Pennsylvania Department of Education

ABSTRACT

A study of the correlates of reading and writing achievement in Pennsylvania's Educational Quality Assessment program was conducted by examining both individual (student level) and ecological (building level) correlations. Analyses were completed for grade levels 5, 8 and 11 for the assessments of 1978 and 1979. Thirty-five variables, classified as school (manipulable) and home/community (nonmanipulable) served as correlates. These variables were derived from students, teachers and the school. Results were highly consistent from one year to another. Although socio-economic level was a prominent effect in building level analyses, significant relationships remained after partialling.

Correlates of Reading and Writing Achievement

INTRODUCTION

The variety of school and community variables collected by Pennsylvania's Educational Quality Assessment (EQA) program prompts many to raise the perennial question of what types of variables relate to reading and writing achievement. Those posing this question to EQA staff typically are administrators whose schools have undergone assessment. Their interest, while sometimes at the theoretical level, is usually based on the hope of identifying variables which impact on achievement. In answering this question, however, it must be kept in mind that a study of statistical relationships describe the manner in which variables are associated with one other but cannot establish definite causal connections.

The EQA program develops statistical relationships for two levels of aggregation. Since statewide assessment programs typically report data to schools in the form of school building and/or district level reports, the unit of analysis for correlations between input and outcome variables is generally at the building or district level. When data in the form of school mean scores are used as the unit of analysis, inferences may be drawn regarding building level achievement, but not individual student achievement. Thus, one can determine the statistical relationship between school reading or writing achievement and average class size, average parental educational level and teacher perception of discipline problems. A second level of analysis, incorporating individual student scores, permits an examination of the relationships between student reading or writing achievement and other student level variables such as amount of television viewing or educational level of parents. Robinson (1950) pointed out that correlations based on aggregated data, termed ecological correlation, should not be confused with or used as a substitute for an individual correlation. Ecological correlations reflect the statistical relationships based on groups rather than individual persons. The intent of this investigation was to examine the correlates of reading and writing achievement of terms of both ecological (building level) and individual (student level) correlations.

Background of the Assessment Program

Pennsylvania's EQA Program has provided a school building assessment on each of the state adopted Goals of Quality Education for the past eleven years. Assessment takes place at grades five, eight and eleven. Students are tested in 14 areas, half of which are cognitive and half, noncognitive. Data are also collected on 35 variables reflecting student background, teacher characteristics and school variables. All of this information is included in an extensive 24 page report returned to the school during a three hour interpretation session conducted by an EQA staff member. Assessment in participating school districts is conducted during the first two weeks of March. Every building in the district housing a fifth, eighth or eleventh grade undergoes assessment and all students within those grade levels are tested. To confine student testing time to 2-2½ hours, multiple matrix sampling techniques are employed. Answer sheets are scanned and scored electronically.

Data Base

Data for the present analysis was obtained from the 1978 and 1979 assessments. In the March 1978 assessment approximately 30,000 students in each of the three grade levels were tested. These students, from 113 school districts, were housed in 453 elementary schools, 151 middle or junior high schools and 128 senior high schools. The number of students and buildings involved in the 1979 assessment were slightly higher. For each of these two years, nearly a quarter of the districts in Pennsylvania, exclusive of Philadelphia and Pittsburgh, were involved. Although participation was voluntary, strong efforts were made to insure geographic balance and representation in terms of district size and wealth.

Analysis of student data was rendered more cost effective by systematically sampling about every ninth student from the main data tapes, producing files consisting of about 3,100 to 3,600 cases per grade level. Student outcome scores were converted into standard scores (with mean of 50 and standard deviation of 10) in order to control for slight differences that occur depending on which test form a student receives. The matrix sampling technique used by EQA involves four forms at grades eight and eleven and three forms at grade five. During test administration, booklets are distributed in such a way that an essentially random fourth (or third) of the students receive a given form. All students respond to an equal number of items on each of the areas assessed. Therefore, if there are 60 items overall in a given area, each form would consist of a different set of 15 (or 20) items. The original assignment of items to forms was done in such a way as to minimize form to form differences in difficulty.

Student Outcome Measures in Reading and Writing

The EQA reading comprehension instrument consists of 48 items at each grade level designed to measure literal and inferential comprehension. Literal refers to the comprehension of details, relationships and major ideas explicitly stated in a passage. The bulk of the test is comprised of inferential items which refer to the comprehension of details, relationships and major ideas implied, but not explicitly stated, in a passage.

The writing skills measure is composed of 45 to 60 objective items, depending on grade level. Measured are skills dealing with mechanics and usage, sentence sense, paragraph organization and effectiveness and appropriateness of tone for a given purpose. Mechanics and usage refers to the use of rules and conventions necessary for effective written communication. The use of clear, economical and effective sentences describes sentence sense. Paragraph organization is defined as coherence, unity and development of paragraphs. The use of the most effective or appropriate tone, style or flavor for a given purpose, audience or situation defines effectiveness and appropriateness.

A further description of the reading and writing instruments, along with reliability and validity information may be found in the technical manual (Kohr, Hertzog and Seiverling, 1980).

Home and Community Variables

Individual student and building level performance in reading and writing skills is related to various characteristics of the home and community. These variables are usually classified as nonmanipulable because the school has little control over these factors. A number of these variables clearly reflect socioeconomic status, such as amount of reading material in the home, parental education and occupation level and percentage of students eligible for Title I. Other family/community variables include the amount of time the student spends watching television on school nights, student perception of parental interest in school, population density, family size, number of older brothers and sisters, stability of student home residence, percentage of white students in the school, student perception of home climate, and perception of personal, parental and teacher educational expectations. These measures are described in greater detail in Appendix A.

School and Teacher Variables

A number of variables depicting school conditions, reflect administrator policies, leadership styles and teacher characteristics which impact on achievement are under the control of the school. The school variables collected by EQA include average class size, grade enrollment, access to the school library, amount of time spent on home work assignments, amount of money the district spends to educate a student.

Variables descriptive of the teaching staff include educational level, experience and teacher locale (whether teaching staff tends to be drawn within or outside the local area). Another set of variables concern teacher perceptions regarding a variety of factors indicative of school climate. These include satisfaction with interaction with students, parents and fellow staff, influence on instructional decisions, view of discipline problems and factors disruptive to classroom management. Appendix B describes how each of the school and teacher variables are scaled.

RESULTS

School Level Analyses

Analyses of the EQA data revealed that both reading and writing achievement at the school building level is related to a number of factors, some of which reflect the home or community while others originate from the school environment. For ease of viewing building level correlations, tables were prepared which separate home/community type variables from school/teacher variables. Another advantage of this distinction is that, for the most part, home/community variables may be viewed as nonmanipulable while most school variables are manipulable, i.e., under considerable control by the school. Table 1 presents reading achievement correlations for 1978 and 1979. Similar results are shown in Table 2 for writing skills achievement.

The strongest correlates of school reading achievement in the three grade levels during 1978 and 1979 were amount of reading materials in

TABLE 1

Summary of Building Level Correlations Between Reading Achievement
and Condition Variables for 1978 and 1979

	Grade 5		Grade 8		Grade 11	
	1978	1979	1978	1979	1978	1979
<u>Home/Community Variables</u>						
Amount reading material in home	.61	.59	.51	.56	.55	.44
Amount television viewing	-.47	-.52	-.65	-.48	-.59	-.46
Parental occupation level	.64	.61	.53	.52	.37	.35
Parental education level	.63	.57	.57	.51	.40	.34
Student perception of parental interest in school	.44	.37	.63	.55	.57	.50
Percentage of students eligible for Title I	-.57	-.59	-.45	-.49	-.29	-.26
Family size	-.46	-.48	-.57	-.49	-.26	-.28
Percentage of white students	.40	.41	.44	.42	.46	.37
Number of older brothers and sisters	.30	.38	.37	.41	.23	.23
Student perception of home climate	.30	.23	.29	.25	.34	.32
Student educational expectations	NA	NA	.42	.33	.24	.25
Student perception of parental expectations	NA	NA	.39	.32	.24	.21
Stability of student residence	.26	.25	.34	.26	.20	.29
<u>School/Teacher Variables</u>						
Teacher/Student/Parent relationships	.60	.55	.55	.51	.43	.41
Teacher view of classroom disruptions	.52	.41	.41	.41	.41	.24
Teacher view of discipline problems	.52	.46	.42	.41	.38	.31
Teacher satisfaction with relationships with parents	.49	.44	.51	.41	.36	.37
Teacher influence on instructional decisions	.38	.29	.34	.22	.35	.29
Student accessibility to library	.30	.29	.29	.22	.39	.36
Favorable teacher/student interaction	.42	.35	.33	.30	.23	.16
Amount of time spent on homework	NS	NS	.32	.33	.27	.15
Teacher educational level	.15	NS	.29	.18	NS	.16
Staff interpersonal relationships	.22	.14	.20	.15	.29	.16

TABLE 2

Summary of Building Level Correlations Between Writing Achievement
and Condition Variables for 1978 and 1979

	Grade 5		Grade 8		Grade 11	
	1978	1979	1978	1979	1978	1979
<u>Home/Community Variables</u>						
Amount reading material in home	.64	.66	.60	.62	.65	.60
Amount television viewing	-.46	-.53	-.65	-.46	-.63	-.54
Parental occupation level	.69	.68	.59	.58	.49	.50
Parental education level	.65	.61	.62	.56	.51	.48
Student perception of parental interest in school	.43	.38	.66	.57	.52	.49
Percentage of students eligible for Title I	-.56	-.60	-.46	-.49	-.47	-.44
Family size	-.46	-.51	-.57	-.51	-.38	-.37
Percentage of white students	.37	.36	.43	.39	.53	.47
Number of older brothers and sisters	.27	.34	.39	.42	.31	.31
Student perception of home climate	.30	.26	.33	.28	.23	.21
Student educational expectations	NA	NA	.48	.40	.35	.37
Student perception of parental expectations	NA	NA	.45	.39	.30	.32
Stability of student residence	.25	.25	.31	.24	NS	.27
<u>School/Teacher Variables</u>						
Teacher/Student/Parent relationships	.60	.56	.56	.52	.47	.44
Teacher view of classroom disruptions	.51	.39	.40	.41	.44	.27
Teacher view of discipline problems	.46	.40	.37	.39	.38	.31
Teacher satisfaction with relationships with parents	.48	.43	.52	.43	.37	.38
Teacher influence on instructional decisions	.38	.30	.32	.22	.35	.30
Student accessibility to library	.28	.29	.23	.16	.31	.29
Favorable teacher/student interaction	.40	.35	.34	.31	.19	.21
Amount of time spent on homework	NS	NS	.29	.34	.28	.21
Teacher educational level	NS	NS	.32	.18	.23	.23
Staff interpersonal relationships	.19	.16	.19	.20	.27	.19

the home, amount of television viewing, parental occupation level and parental education level, each of which were among the top five in five of the six instances. Student perception of parental interest in school was especially powerful in grades 8 and 11 where it was among the top two correlates both years. Similar results were obtained for school writing skills achievement.

Of the school variables, teacher relationship with students and parents was most highly correlated with both school reading and writing achievement both years at each grade level. Other variables consistently found among the top five correlates were teacher view of classroom disruption, teacher view of discipline problems and teacher satisfaction with relationships with parents.

The general consistency of building level correlations during 1978 and 1979 lend confidence to the findings. Although home/community SES type variables tend to bear the highest relationship with building achievement, a number of school variables also show substantial correlations. Since school staff have some degree of control over how they handle classroom management, discipline, instructional decisions, parental relationships, etc., it might be anticipated that efforts to improve these areas would lead to a more conducive atmosphere to foster motivation and learning.

Seven of the home/community and school/teacher variables are not listed in these tables because they rarely reached a statistically significant relationship with school reading and writing achievement. Among those variables not displaying a significant relationship were population density, student perception of teacher expectations, average class size, and grade enrollment. Tuition and teacher experience revealed non-significant relationships at grades 8 and 11 and small, but significant relationships with reading and writing at grade 5. Teacher locale showed an inconsistent picture of small, negative relationships with reading and writing at grade 5, non-significant relationships at grade 8 and significant, negative correlations (averaging about $-.25$) at grade 11.

Class size is a variable of both political and instructional interest, stimulated in part by the consciousness of cost reduction and research findings such as Glass and Smith's (1978) meta analysis. The lack of a class size relationship in the EQA data is probably the result of several factors. First, the unit of analysis is the building rather than the classroom. Consequently, the average class size for these schools typically ranges from 20 to 28, a narrow range indeed. Secondly, buildings from urban areas with low achievement levels often use small classes in order to exert greater classroom control, a factor which confounds the class size effect.

During the course of analysis it was observed that community socioeconomic status, as measured by parental occupation, bore a substantial relationship with other home/community variables as well as some school variables. This aroused the suspicion that variables such as television viewing, teacher/student/parent relationships, classroom disruptions, discipline problems, etc., may be a function of socioeconomic level. To explore this possibility, the effect of socioeconomic status was statistically

TABLE 3

Summary of Building Level Partial Correlations Between Reading Achievement
and Condition Variables for 1978 and 1979 Controlling for Parental Occupation

	Grade 5		Grade 8		Grade 11	
	<u>1978</u>	<u>1979</u>	<u>1978</u>	<u>1979</u>	<u>1978</u>	<u>1979</u>
<u>Home/Community Variables</u>						
Amount reading material in home	.25	.26	.19	.32	.45	.31
Amount television viewing	-.26	-.30	-.51	-.34	-.50	-.34
Student perception of parental interest in school	.28	.22	.49	.43	.53	.43
Percentage of students eligible for Title I	-.22	-.28	-.12	-.25	-.07	-.06
Family size	-.17	-.22	-.35	-.27	-.10	-.15
Percentage of white students	.32	.32	.44	.44	.46	.40
Number of older brothers and sisters	.14	.22	.21	.25	.13	.12
Student perception of home climate	.20	.13	.18	.20	.39	.32
Student educational expectations	NA	NA	.02	-.09	-.04	.01
Student perception of parental expectations	NA	NA	.02	-.06	-.02	-.01
Stability of student residence	.26	.26	.47	.42	.37	.48
<u>School/Teacher Variables</u>						
Teacher/Student/Parent relationships	.33	.29	.32	.31	.31	.31
Teacher view of classroom disruptions	.30	.25	.31	.32	.42	.30
Teacher view of discipline problems	.38	.32	.34	.36	.32	.28
Teacher satisfaction with relationships with parents	.26	.23	.32	.28	.27	.27
Teacher influence on instructional decisions	.25	.18	.26	.13	.29	.23
Student accessibility to library	.16	.18	.34	.26	.39	.41
Favorable teacher/student interaction	.24	.19	.18	.17	.11	.07
Amount of time spent on homework	.07	.06	.24	.19	.22	.05

TABLE 4

Summary of Building Level Partial Correlations Between Writing Achievement
and Condition Variables for 1978 and 1979 Controlling for Parental Occupation

	Grade 5		Grade 8		Grade 11	
	<u>1978</u>	<u>1979</u>	<u>1978</u>	<u>1979</u>	<u>1978</u>	<u>1979</u>
<u>Home/Community Variables</u>						
Amount reading material in home	.28	.31	.28	.37	.49	.42
Amount television viewing	-.22	-.30	-.49	-.29	-.49	-.36
Student perception of parental interest in school	.26	.21	.52	.44	.46	.38
Percentage of students eligible for Title I	-.16	-.24	-.08	-.21	-.22	-.19
Family size	-.14	-.24	-.31	-.27	-.20	-.20
Percentage of white students	.27	.26	.43	.42	.56	.55
Number of older brothers and sisters	.09	.15	.21	.24	.18	.16
Student perception of home climate	.19	.16	.22	.23	.30	.22
Student educational expectations	NA	NA	.05	-.03	.01	.05
Student perception of parental expectations	NA	NA	.06	-.01	.05	.01
Stability of student residence	.25	.27	.46	.42	.41	.56
<u>School/Teacher Variables</u>						
Teacher/Student/Parent relationships	.28	.27	.30	.31	.29	.31
Teacher view of classroom disruptions	.27	.21	.29	.32	.47	.37
Teacher view of discipline problems	.30	.22	.28	.32	.31	.28
Teacher satisfaction with relationships with parents	.23	.20	.31	.28	.25	.24
Teacher influence on instructional decisions	.25	.19	.22	.12	.27	.22
Student accessibility to library	.12	.17	.27	.21	.31	.37
Favorable teacher/student interaction	.20	.16	.18	.17	.02	.08
Amount of time spent on homework	-.07	-.02	.20	.18	.17	.08

removed through partial correlation. Summarized in Table 3 are the correlations between school reading achievement and the condition variables with the effect of parental occupation (representing socioeconomic status), partialled out. Similarly, the partial correlations between school writing achievement and the condition variables are shown in Table 4. Comparing Table 3 with Table 1 reveals a general tendency toward a reduction in the magnitude of the relationships. The effect is particularly dramatic for parental and student expectations at grades 8 and 11. While still substantially reduced, a moderate relationship remains between the school variables and reading and writing achievement.

Curvilinear Relationships Observed in Building Level Analyses

Although not displayed in the tables, the variable population density deserves some consideration. Its non-appearance in the tables results from its typically nonsignificant linear relationship with reading and writing. Correlations ranged from $-.04$ to $-.17$. Interestingly, after parental occupation was partialled out, the relationship increased in each instance. For example, the correlation between grade 11 reading and population density was $-.13$ in 1978 and $-.11$ in 1979. After partialing, the relationship increased to $-.30$ and $-.26$, respectively. Since population density has a small to moderate positive correlation with parental occupation, the partial correlations were expected to exhibit some decrease rather than an increase. In such cases, nonlinearity is frequently present. Correlations depicting a quadratic form were computed by entering both a linear and a squared population density term into regression analysis with achievement as the dependent variable (Cohen and Cohen, 1975). At grades 5 and 8 the quadratic relationship improved the accounted for variance by approximately 11 percent. For example, the $-.15$ linear correlation between population density and reading (grade 8, 1978) reached $.36$ using a quadratic model. The increase in percentage of accounted for variance using the quadratic model at grade 11, averaging about four percent, were not as large as found in the other grade levels. Population density was also related to parental occupation in a nonlinear fashion. Regardless of grade level, the quadratic model accounted for about 22 percent additional variance. For example, the linear and quadratic relationship observed at grade 8, 1979 was $.24$ and $.54$, respectively. The scatter plot revealed that higher occupation levels are found in moderately populated suburban communities than observed in either sparsely or densely populated areas.

At grades 8 and 11, stability of student residence also displayed larger partial correlations than zero order correlations with reading and writing achievement. Analyses using a quadratic model showed increases of only about one to five percent additional variance accounted for. Stability of student residence was found to have a curvilinear relationship with parental occupation, with the quadratic model generally accounting for an additional seven percent of the variance. The scatter plot suggested that communities exhibiting either great mobility or high stability had lower occupation levels while a moderate level of stability was associated with higher occupation levels.

Student Level Correlations

Student level correlations for reading and writing skills were only produced in 1978 and are shown in Table 5. The statistical relationships involving student level data generally were not nearly as strong as those observed for building performance. Nevertheless, some consistent findings occurred. Student reading and writing achievement was most strongly related to parental and personal educational expectations for 8th and 11th graders. Student perception of parental interest in school, amount of reading material available to the student in the home and teacher expectations also related significantly to student reading and writing achievement.

At the individual student level, it is interesting to note that for 11th graders, parental interest in school, personal expectations and expectations of parents and teachers were more highly related to reading achievement than parental education or occupational levels. For 8th graders, personal and parental expectations were particularly strong. These results are consistent with much of the literature in showing that expectations communicated by parents and teachers are important influences to the formation of student expectations and achievement.

One thing which must be kept in mind regarding the rather low individual correlations is that each student responds to only a third (grade 5) or a fourth (grades 8 and 11) of the items comprising the reading and writing measures. The matrix sampling process is set up to provide reliable estimates of building mean scores based on the complete set of reading and writing items, not to yield individual student scores. Therefore, the student scores used in these correlations are not only lacking in reliability but also include form to form differences as a source of error variance.

Summary

The present analyses are consistent with many studies in demonstrating a strong relationship between socioeconomic factors and building level achievement in reading and writing skills. These include a positive relationship with parental education and occupation, amount of reading materials in the home and percentage of white students and a negative relationship with family size. A number of school/teacher variables which reflected substantial correlations with achievement were found to undergo a sizable reduction when parental occupation was partialled out. The partial correlations between achievement and teacher perceptions of their relationships with students and parents, classroom disruptions, discipline problems and satisfaction with parental relationships were statistically significant and consistently accounted for about ten percent of the between building test score variance. These findings are similar to those reported by various studies of school effects which partial out socioeconomic characteristics (Bridge, Judd and Moock, 1979). The actual contribution of these variables is underestimated since the method employed in this study did not separate out the proportion of variance common to both socioeconomic and school factors. Instead, this shared variance is lumped in with socioeconomic conditions.

TABLE 5

Summary of Student Level Correlations Between Reading and
Writing Scores and Student Condition Variables for 1978

	Reading			Writing		
	5	8	11	5	8	11
<u>Student Condition Variables</u>						
Student educational expectations	NA	.32	.35	NA	.31	.38
Student perception of parental expectations	NA	.31	.37	NA	.29	.39
Student perception of parental interest in school	.13	.23	.31	.14	.20	.30
Parental education level	.20	.24	.20	.19	.22	.22
11 Amount of reading material in home	.22	.20	.22	.26	.21	.28
Parental occupation level	.20	.22	.14	.18	.21	.18
Student perception of teacher expectations	NA	.21	.28	NA	.20	.30
Family size	-.16	-.15	NS	-.13	-.16	-.15
Stability of student residence	.14	NS	.14	.15	.14	.17
Amount of television viewing	-.14	NS	-.13	-.12	-.09	-.13
Amount of time spent on homework	NS	NS	.20	NS	.13	.20
Race (white = 2, nonwhite = 1)	.17	NS	NS	-.14	NS	NS
Student accessibility to library	NS	NS	.17	.12	NS	.17

A curvilinear relationship was found between building level achievement and two of the community variables, population density and stability of student residence.

Student level correlations were characteristically much lower than those based on data aggregated at the building level. At the 8th and 11th grade levels, parental and personal educational expectations were the most prominent.

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APPENDIX A

DESCRIPTION OF HOME/COMMUNITY VARIABLES

VARIABLE	MEASURE	WEIGHTING	INDEX DESCRIPTION
Amount of reading material in the home.	The students reported on five items the amount of reading materials in the home.	Each item assigned a weight for the amount of that type of reading materials in the home.	The higher value indicates the students reported more reading materials in the home.
Amount of television viewing	The students reported their estimates of time usually spent watching television from the time they get home from school until they go to bed.	4 = About five hours or more 3 = About four hours 2 = About three hours 1 = About two hours 0 = About one hour or less	A higher value indicates that students of the school watch more television on school nights.
Family size	The students reported the number of brothers and sisters they have.	Expressed as average number of siblings.	A higher value indicates that the students of the school come from larger families.
Number of older brothers and sisters	The students reported the number of <i>older</i> brothers and sisters they have.	0 = 2 1-2 = 1 3-9 = 0	A higher value indicates that the students of the school are more likely to be the eldest in their families.
Parental education	The higher level of the following two was used: (1) The students reported the highest level of formal education attained by their fathers or male guardians. (2) The students reported the highest level of formal education attained by their mothers or female guardians	8 = Ph.D. or professional degree 7 = Some work toward Ph.D. or professional degree 6 = Master's degree 5 = Bachelor's degree 4 = Some college, vocational, business school after high school 3 = High school graduate 2 = Some high school, but not a graduate 1 = Completed grade school 0 = None or some grade school	A higher value indicates that the school draws students from homes in which at least one of the parents has a higher average level of formal education.
Parental occupation	The highest level of the following two was used: (1) The students reported the occupation most like their fathers' or male guardians found on a list of 148 possible occupation and 6 special categories. (2) The students reported the occupation most like mothers' or female guardians (if employed) on the list of 148 possible occupations and 6 special categories.	The occupational categories were weighted from 1 to 99 according to a combination of education needed to secure the occupation and income derived from the occupation. The higher level was used to allow for family support by either the male or female parent.	A higher value indicates that the school tends to draw a large proportion of its students from homes where the higher level parent is employed in higher-paying jobs requiring higher educational levels.
Percentage of students eligible for Title I	The percent of students by school reported to the Department (Title I) that are from low income families. (DEBE-1056)	Expressed to nearest tenth of a per cent.	A higher value indicates a higher per cent of students from low income families.

APPENDIX A CONTINUED

VARIABLE	MEASURE	WEIGHTING	INDEX DESCRIPTION
Percentage of white students	The students reported their race.	Expressed in percentage.	A higher value indicates that the school has a greater proportion of white students in the grade level.
Population density	The students with the aid of the monitor reported the types of communities in which they were then living.	7 = In Philadelphia or Pittsburgh 6 = Inside a large city (100,000 to 500,000 people). 5 = Inside a medium size city (10,000 to 100,000) 4 = In a suburb of Philadelphia or Pittsburgh 3 = In a suburb of a large city 2 = In a suburb of a medium size city 1 = In a small town (less than 10,000 people.) 0 = In the open country or in a farming community.	A higher value indicates that the students reside in larger areas of dense population, i.e., more removed from open space.
Stability of student residence	The student reported the number of different school buildings attended within the past 3 years because family changed residence.	4 = My family has not moved within the past 3 years 3 = 2 school buildings 2 = 3 school buildings 1 = 4 school buildings 0 = 5 or more school buildings	A higher value indicates that the students come from families which are more stable.
Student educational expectations (Grades 8 and 11 only)	The students reported how far they expect to go in school.	4 = Beyond college graduation 3 = Graduation from college 2 = Some college or other post-high school training 1 = Graduation from high school 0 = Some high school	A higher score indicates that the students of the school have higher educational expectations.
Student perception of parental expectations (Grades 8 and 11 only)	The students reported their perception on: (1) What do your parents encourage you to do? (2) How much schooling do your parents expect you to complete?	For item 1: 3 = To be one of the best students in the class 2 = To be above average students in the class 1 = To be at least an average student 0 = To do just well enough to get by For item 2: 4 = Beyond college graduation 3 = Graduation from college 2 = Some college or other post-high school training 1 = Graduation from high school 0 = Some high school	A higher score indicates that the students feel that their parents expect them to do well in school and expect them to achieve higher educational levels.

APPENDIX A CONTINUED

VARIABLE	MEASURE	WEIGHTING	INDEX DESCRIPTION
Student perception of teacher expectations (Grades 8 and 11 only)	The students reported their perception of their teachers' expectations of them.	3 = One of the best students in the class 2 = Above average in the class 1 = At least an average student 0 = A below average student	A higher score indicates that the students of the school feel that teachers expect more effort from them.
Student perception of home climate	The students reported their opinion on 12 items about home conditions. (3 per form)	Very true of me Mostly true of me Mostly untrue of me Very untrue of me	A higher value indicates that the students have more favorable attitudes toward their home conditions.
Student perception of parental interest in school	The students reported their opinions on three items: (1) My parents enjoy hearing about school. (2) My parents feel the school is doing a good job. (3) My parents support what the school does.	3 = Almost always 2 = Usually 1 = Sometimes 0 = Almost never	A higher value indicates that the students felt their parents have a great interest in the school, a higher opinion of the work of the school, and greater support of the school.

APPENDIX B

DESCRIPTION OF SCHOOL AND TEACHER VARIABLES

SCHOOL VARIABLES	MEASURE	WEIGHTING	INDEX DESCRIPTION
Amount of time spent on homework	The students reported their estimates of time usually spent on homework from the time they get home from school until they go to bed.	4 = About three hours or more 3 = About two hours 2 = About one hour 1 = Less than one hour 0 = None	A higher value indicates that students of the school spent more time on homework on school nights.
Average class size	The teachers reported their average class size excluding supervisory duties such as study hall.	Expressed as average class size for all teachers.	A higher value indicates a greater average class size.
Grade enrollment	The school administrator reported enrollment of the grade under consideration.	Actual number of students in the participating grade.	A higher value indicates a larger grade enrollment.
Student accessibility to library	The students reported how often they were able to use the school library.	3 = More than three times a week 2 = Two or three times a week 1 = Once a week 0 = Never	A higher score indicates that the students report greater accessibility of the library.
Tuition	The tuition rate established for the school districts was obtained from Department records. (DECO-507)	Expressed to nearest whole dollar for 1978-79.	A higher value indicates that the district claims to expend relatively more funds per students.
TEACHER VARIABLES			
Favorable student/teacher interaction	The teachers indicated the degree to which each of five statements about their interactions with students constitute a problem in their school.	3 = Not a problem 2 = Moderate problem 1 = Serious problem 0 = Critical problem	A higher score indicates that the teaching staff is more satisfied with their interactions with students.
Self interpersonal relationships	The teachers indicated the degree to which each of three statements about staff interaction and support constitute a problem in their school.	3 = Not a problem 2 = Moderate problem 1 = Serious problem 0 = Critical problem	The higher value indicates that the teaching staff and other school staff interact better.
Teacher education	The teachers indicated the level of formal education they have attained.	4 = Doctor's degree 3 = Master's degree plus 1 year 2 = Master's degree or equivalency 1 = Bachelor's degree 0 = No degree	A higher value indicates that the school's instructional staff reported a higher level of formal education.
Teacher experience	The teachers reported the total years of service in teaching including the current school year.	Expressed as average years' experience.	A higher value indicates that the teachers of the school have relatively more years of teaching experience.

APPENDIX B CONTINUED

TEACHER VARIABLES	MEASURE	WEIGHTING	INDEX DESCRIPTION
Teacher influence upon instructional decisions	The teachers indicated the degree to which each of nine statements about their influence on learning conditions constitutes a problem in their school.	3 = Not a problem 2 = Moderate problem 1 = Serious problem 0 = Critical problem	A higher value indicates that the teaching staff has a greater influence on decisions which affect the instructional processes.
Teacher locale	The teachers reported where they graduated from high school.	0 = 100 miles or more from boundaries of the school district 1 = More than 30 miles but less than 100 miles 2 = In or within 30 miles	A higher value indicates that the school teaching staff is more often drawn from local areas.
Teacher satisfaction with relationships with parents	The teachers reported how satisfied they were with their relationships with parents and parent groups	3 = Very satisfied 2 = Somewhat satisfied 1 = Somewhat dissatisfied 0 = Very dissatisfied	A higher score indicates a greater satisfaction of the teaching staff with the cooperation and contacts they have with parents and parent groups.
Teacher/Student/Parent relationship	The teachers indicated the degree to which each of nine statements about the interest of the students and the support and interaction with the parents constitute a problem in their school.	3 = Not a problem 2 = Moderate problem 1 = Serious problem 0 = Critical problem	A higher score indicates that the teaching staff feels that the students and parents support and interact with the school more.
Teacher view of classroom disruptions	The teachers indicated the degree to which each of eight statements about factors that affect classroom management in the school constitute a problem for them.	3 = Not a problem 2 = Moderate problem 1 = Serious problem 0 = Critical problem	A higher value indicates that the teaching staff is more satisfied in classroom management situations.
Teacher view of discipline problems	The teachers indicated the degree to which each of five statements about the discipline procedures of the school constitutes a problem for them.	3 = Not a problem 2 = Moderate problem 1 = Serious problem 0 = Critical problem	The higher value indicates that the teaching staff is more satisfied with the way discipline is handled in the school.